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Nota di contenuto	Front Cover; Computational Methods for Modelling of Nonlinear Systems; Copyright Page; Preface; Table of Contents; Chapter 1 Overview; Part I Methods of Operator Approximation in System Modelling; Chapter 2 Nonlinear Operator Approximation with Preassigned Accuracy; 2.1 Introduction; 2.2 Generic Formulation of the Problem; 2.3 Operator Approximation in Space $C([0, 1])$; 2.4 Operator Approximation in Banach Spaces by Operator Polynomials; 2.5 Approximation on Compact Sets in Topological Vector Spaces; 2.6 Approximation on Noncompact Sets in Hilbert Spaces 2.7 Special Results for Maps into Banach Spaces 2.8 Concluding Remarks; Chapter 3 Interpolation of Nonlinear Operators; 3.1 Introduction; 3.2 Lagrange Interpolation in Banach Spaces; 3.3 Weak Interpolation of Nonlinear Operators; 3.4 Strong interpolation; 3.5 Interpolation and approximation; 3.6 Some Related Results; 3.7 Concluding Remarks; Chapter 4 Realistic Operators and their Approximation; 4.1 Introduction; 4.2 Formalization of Concepts Related to Description of Real-World Objects; 4.3 Approximation of R-continuous Operators; 4.4 Concluding Remarks Chapter 5 Methods of Best Approximation for Nonlinear Operators 5.1 Introduction; 5.2 Best Approximation of Nonlinear Operators in Banach Spaces: "Deterministic" Case; 5.3 Estimation of Mean and Covariance

Matrix for Random Vectors; 5.4 Best Hadamard-quadratic Approximation; 5.5 Best r -Degree Polynomial Approximation; 5.6 Best Causal Approximation; 5.7 Best Hybrid Approximations; 5.8 Concluding Remarks; Part II Optimal Estimation of Random Vectors; Chapter 6 Computational Methods for Optimal Filtering of Stochastic Signals; 6.1 Introduction

6.2 Optimal Linear Filtering in Finite Dimensional Vector Spaces; 6.3 Optimal Linear Filtering in Hilbert Spaces; 6.4 Optimal Causal Linear Filtering with Piecewise Constant Memory; 6.5 Optimal Causal Polynomial Filtering with Arbitrarily Variable Memory; 6.6 Optimal Nonlinear Filtering with no Memory Constraint; 6.7 Concluding Remarks; Chapter 7 Computational Methods for Optimal Compression and Reconstruction of Random Data; 7.1 Introduction; 7.2 Standard Principal Component Analysis and Karhunen-Loeve Transform (PCA-KLT); 7.3 Rank-constrained Matrix Approximations; 7.4 A Generic Principal Component Analysis and Karhunen-Loeve Transform; 7.5 Optimal Hybrid Transform Based on Hadamard-quadratic Approximation; 7.6 Optimal Transform Formed by a Combination of Nonlinear Operators; 7.7 Optimal Generalized Hybrid Transform; 7.8 Concluding Remarks; Bibliography; Index; Series Page

Sommario/riassunto

In this book, we study theoretical and practical aspects of computing methods for mathematical modelling of nonlinear systems. A number of computing techniques are considered, such as methods of operator approximation with any given accuracy; operator interpolation techniques including a non-Lagrange interpolation; methods of system representation subject to constraints associated with concepts of causality, memory and stationarity; methods of system representation with an accuracy that is the best within a given class of models; methods of covariance matrix estimation; methods for low-rank
